

## **DISHWASHER SAFE THERMOMETER**

This application claims the benefit of Provisional Patent Application No. 60/459,256 filed April 2, 2003.

### **I. Field of the Invention**

**[0001]** This invention relates generally to digital thermometers. More particularly, the invention relates to digital thermometers that are capable of operating in a commercial dishwasher.

### **II. Background of the Invention**

**[0002]** Digital thermometers are widely employed in many applications where it is desirable to measure temperature. In most applications, it is important to thoroughly clean the thermometers after each use. Many conventional thermometers must be cleaned by hand because they cannot withstand the high temperatures and exposure to water that occur when they are mechanically washed, for example in a dishwasher.

**[0003]** In the wash cycle of commercial dishwashers, the temperature is required to reach 180°F for at least 2 minutes. Because conventional thermometers do not reliably operate under those conditions, it has been difficult to test the peak temperatures of commercial dishwashers.

**[0004]** Accordingly, there is a need for a thermometer that can survive the wash cycle of commercial dishwashers and can test the peak temperature of commercial dishwashers.

### **III. Summary of the Invention**

**[0005]** It is an object of this invention to provide a watertight digital thermometer.

**[0006]** It is a further object of the invention to provide a thermometer that is operational in ambient temperatures of 180°F or more.

**[0007]** In accordance with an aspect of the invention digital thermometer comprises a housing having first and second portions, where the first portion defining a cavity. A waterproof seal is disposed between the first and second portions of the housing. Temperature conversion logic is disposed within the cavity of said housing and said temperature conversion logic is encapsulated by a material having low thermal conductivity. To protect against high heat, an insulating member is disposed in the cavity of said housing and a probe connected to said housing.

**[0008]** Given the following enabling description of the drawings, the apparatus should become evident to a person of ordinary skill in the art.

#### **IV. Brief Description of the Drawings**

**[0009]** Figure 1 is a cross sectional view of a thermometer in accordance with the invention.

#### **V. Detailed Description of the Drawings**

**[0010]** Referring to Figure 1, an exemplary embodiment of the dishwasher safe digital thermometer includes a housing having at least two parts 15 and 20. One part of the housing 15 defines a cavity in which conventional temperature conversion logic 25 is disposed. A probe 30 is connected to the housing and the probe includes a temperature-sensing element 35.

**[0011]** In keeping with the invention, to protect against water damage, a seal a watertight seal 40 is provided between the first and second parts of the housing.

[0012] Further in keeping with the invention temperature conversion logic 25 is encapsulated by a material having low thermal conductivity, e.g., epoxy. ME350A and ME350B available from Lord Corporation of Cary, N.C. are particularly preferred. To help further insulate the temperature control logic and to minimize harmful moisture build-up in the housing, insulating member 45 is disposed in the cavity of the housing. Insulating member 45 is preferably comprised of foam, more preferably polystyrene. Insulating member 45 may be prefabricated using a mold or may be sprayed or blown into the cavity.

[0013] In accordance with the invention, seal 40 may be a temperature resistant glue such as LOCTITE® high temperature glue. Alternatively, seal 40 may comprise an ultrasonic weld created using an ultrasonic welding machine such as Model NK-1518 made by NEKON ULTRASONIC. In other embodiments, seal 40 may comprise a gasket disposed between first and second portions 15 and 20 the housing with screws (not shown) interconnecting the first and second portions. As used herein, waterproof seal refers to a seal that meets the international standard for water proofing IEC 529 (IP67).

[0014] To withstand the temperatures of commercial dishwashers, the housing is preferably formed from a polymer type thermoplastic such as Polycarbonate or Acrylonitrile Butadiene Styrene.